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(54) **Channel selection in a television receiver.**

(57) To suppress artefacts on the screen of a television receiver due to the locking and synchronizing process during switching from one channel to another, means is provided effecting that with switching from one channel to another there occurs on the picture screen a smooth fading from the picture of the first channel to the picture of the second channel. For example the picture of the second channel after switching operation may start with a small area in the centre, in the left bottom corner and then increase in area up to the full area within a duration of some pictures. Other examples include the introduction of the new channel picture may be by a panning of the picture from the bottom to the top or from the left to the right.



Fig. 3



Fig. 4



Fig. 5



Fig. 6

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The invention refers to a television receiver including a channel selector according to the introductory part of claim 1. On current television sets when the observer switches from one channel to another he can see all the channel switching artefacts on the screen with all the locking and synchronizing process. The result of this is not very nice to see.

It is an object of the invention to suppress such artefacts due to locking and synchronizing process and to improve the subjective picture impression during channel switching.

According to the invention means is provided effecting that with switching from a first channel to a second channel there occurs a smooth fading from the picture of the first channel to the picture of the second channel on the picture screen.

The introduction of the new channel picture may be realized by a growing square centered on the screen. Otherwise the introduction of the new channel picture may be made by a panning corner starting for example from the left bottom corner. Introduction of the new channel picture may also be made by a vertical panning of the picture from the bottom to the top or by a horizontal panning of the picture from the left to the right of the screen or by any other special effect.

According to one embodiment of the invention immediately after channel switching the picture signal of the first channel is fed to the picture tube for the duration of some pictures and thereupon the smooth fading from the picture of the first channel to the picture of the second channel is performed. The signal for the picture of the first channel after switching from the first channel to the second channel may be derived from a picture memory fed with the incoming signal or from a second tuner provided within the television receiver.

Preferably a picture memory is provided within the signal path to the picture tube. The signal for the picture of the first channel which is displayed after switching from the first to the second channel with a decreasing picture area can be derived from the output of said memory, whereas the signal for the picture of the second channel which is displayed with increasing area on the screen is derived from the tuner, now tuned to the second channel.

The total period from the moment of switching from the first channel to the second channel up to the full display of the picture of the second channel may last about 10 pictures or also a longer time of 1 to 2 seconds. The signal of the second channel may be modified by time compression in such a way that in the increasing partial area occupied by the signal of the second channel the complete picture of the second channel is displayed with reduced dimensions.

In order to make the invention comprehensible some examples of the invention are now described in combination with the attached drawing. Within the drawing:

Figure 1 is a simplified block diagram of a television receiver according to the invention,

Figure 2 is another block diagram of an example of the invention and

Figure 3 to 6 are different forms for smooth fading from the picture of the first channel to the picture of the second channel. Within said figures the white areas represent the picture of the first channel with decreasing area whereas the black areas represent the picture of the second channel with increasing area.

Fig. 1 shows the antenna 1 adapted to receive a plurality of television channels and connected to the receiver 2 including the tuner and all other circuits for converting the received signal to a picture signal for controlling the picture tube 3. Within the signal path from receiver 2 to picture tube 3 a memory 4 for several television pictures is provided. A special effect memory command circuit 5 is connected both to the receiver 2 and the memory 4. A channel command signal is applied to circuit 5 wire terminal 6. The output of memory 4 is controlled by the deflection circuit.

When switching receiver 2 from a first channel to a second channel by tuning, the picture displayed on the tube 3 does not suddenly change from the first channel to the second channel as in prior art television receivers. Instead of this, there is effected - by using memory 4 - a smooth fading or transition from the picture of the first channel to the picture of the second channel to which the receiver is switched by channel selection.

In Fig. 3 the white area 7 represents the picture of the first channel immediately after the switching operation, whereas the black area 8 represents the picture of the second channel. As it can be seen, the area 8 is growing after switching operation within a period of several pictures or even after some seconds to the full area of the screen. At the end of this growing process the dark area 8 of the picture of the newly tuned second channel occupies the complete area of the screen.

Fig. 4 represents the introduction of the new channel picture by a panning corner starting from the left bottom corner.

Fig. 5 presents the introduction of the new channel picture by a vertical panning of the picture from the bottom to the top.

Fig. 6 presents the introduction of the new channel picture by a horizontal panning of the picture from the left to the right.

In the embodiment according to Fig. 2 two receivers 2a, 2b are provided which can be tuned to different channels. If, for example, receiver 2a

receives a first channel and the receiver shall be switched to a second channel, then for the first receiver 2b is switched to a second channel, whereas receiver 2a remains tuned to the first channel. In this case for a short time after the switching operation both signals of the first channel and the second channel are available for a picture reproduction according to Figures 3 to 6. It can be seen, that in this case it will not be necessary to freeze or memory the signal because after channel switching signals of both channels are available. In this case there is provided within the signal path to the picture tube 3 a fast switch controlled by the deflection circuit and switching between the outputs of receivers 2a, 2b in such a way that the patterns according to Figures 3 to 6 are achieved on the picture screen.

Claims

1. A television receiver including a channel selector for selecting different channels, **characterized in that** means is provided effecting that with switching from a first channel to a second channel there occurs on the screen of the picture tube (3) a smooth fading from the picture of the first channel to the picture of the second channel.
2. A receiver according to claim 1, **characterized in that** there is inserted into the path of the picture signal to the picture tube (3) a picture memory (4) from which is read after the switching process the signal of the first channel for the picture display.
3. A receiver according to claim 1, **characterized in that** immediately after the channel switching the picture signal of the first channel is fed to the picture tube (3) for the duration of some pictures and that subsequent to this said smooth fading is started.
4. A receiver according to claim 3, **characterized in that** the total operation up to the end of the fading process occupies a period in the region of 10 pictures.
5. A receiver according to claim 1, **characterized in that** there is inserted into the path of the picture signal a fast switch controlled by the deflection circuit, said switch switching in dependence from the actual position of the electron beam on the screen the control input of the picture tube (3) between the picture signals of the first and the second channel.
6. A receiver according to claim 1, **characterized in that** after channel switching the picture of the second channel for the first occupies only a small region of the screen, said region increasing during a period of a number of pictures up to the full picture area.
7. A receiver according to claim 6, **characterized in that** that the area of the screen not occupied by the picture of the second channel is occupied by the signal of the first channel derived from said picture memory (4).
8. A receiver according to claim 1, **characterized in that** the picture signal of the second channel is modified by time compression in such a way that within the partial area the complete picture of the second channel is reproduced.
9. A receiver according to claim 1, **characterized in that** after the switching process increasingly more and more pixels, lines or partial areas of the screen uniformly distributed over the screen are related to the picture of the second channel.
10. A receiver according to claim 1, **characterized in that** after the switching process the pictures of the first and the second channel both occupy the complete screen and that there upon during a number of pictures the amplitude of the picture signal of the first channel derives from the nominal value to zero and the amplitude of the picture signal of the second channel increases from zero up to the nominal value.
11. A receiver according to claim 1, **characterized in that** the receiver includes two tuners (2a, 2b) and the fading process is made by controlled switching between the output of said two tuners or by freezing one picture.

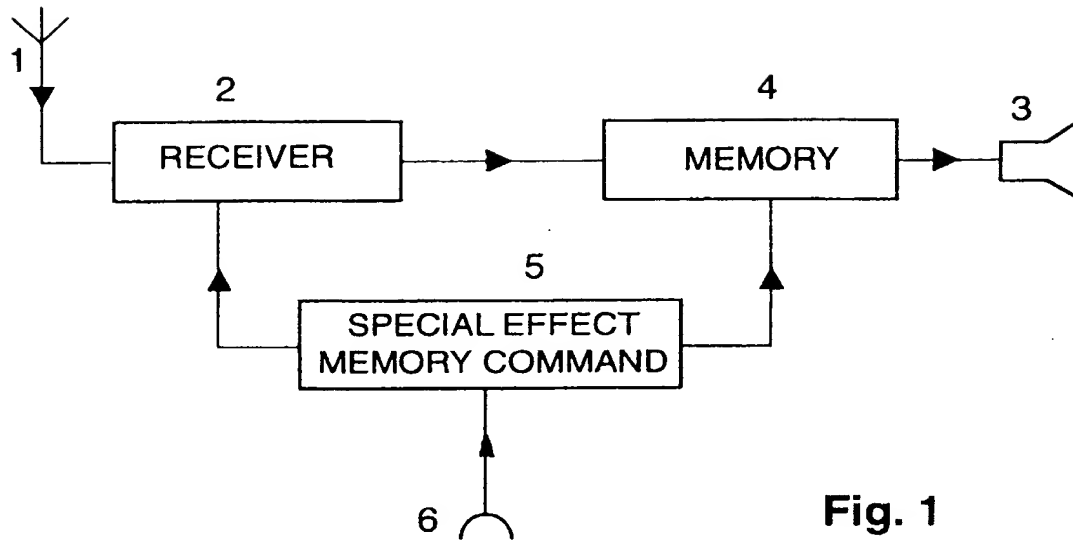


Fig. 1

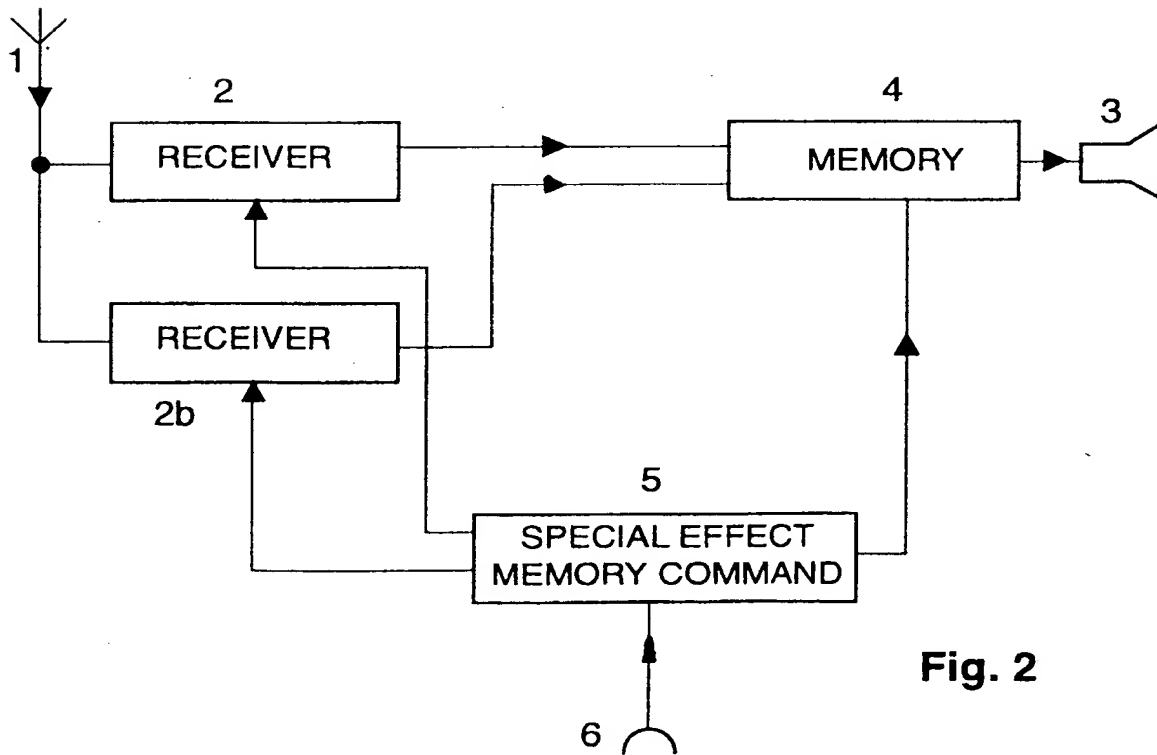


Fig. 2

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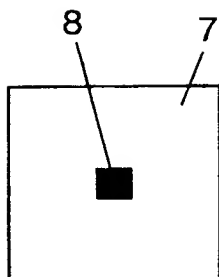


Fig. 3

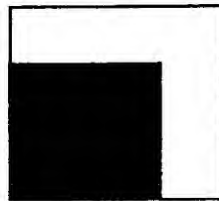
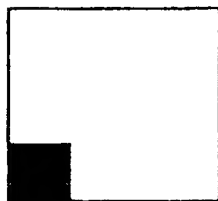
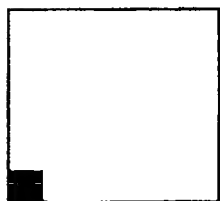


Fig. 4

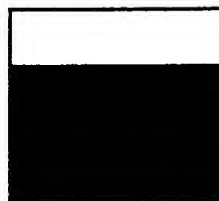
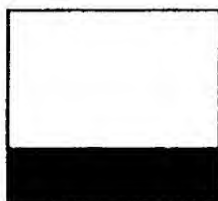
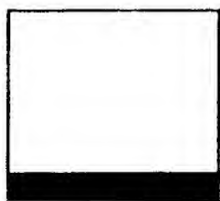


Fig. 5

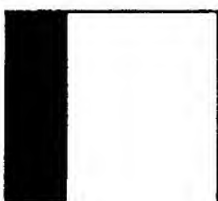


Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 93 40 3060

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP-A-0 306 704 (DEUTSCHE THOMSON-BRANDT GMBH) * the whole document *	1,2	H04N5/445
A	GB-A-2 257 594 (SAMSUNG ELECTRONICS CO LIMITED) * the whole document *	1,2,11	
A	FR-A-2 595 893 (BERTIGNON) * page 2, line 19 - line 21 *	1,10	
A	PATENT ABSTRACTS OF JAPAN vol. 15, no. 453 (E-1134) 18 November 1991 & JP-A-03 191 682 (TOSHIBA CORP) 21 August 1991 * abstract *	1,2,11	
A	PATENT ABSTRACTS OF JAPAN vol. 12, no. 414 (E-677) 2 November 1988 & JP-A-63 153 908 (MATSUSHITA ELECTRIC IND CO) 27 June 1988 * abstract *	1,2,11	
A	PATENT ABSTRACTS OF JAPAN vol. 13, no. 534 (E-852) 29 November 1989 & JP-A-01 218 274 (SONY CORPORATION) 31 August 1989 * abstract *	1,2,11	
A	US-A-4 249 211 (BABA T. ET AL) * the whole document *	1,6-8	
A	EP-A-0 267 020 (MATSUSHITA ELECTRIC INDUSTRIAL CO LTD) * the whole document *	1,6-8	
A	US-A-5 021 883 (SAKAMOTO N. ET AL) * the whole document *	1,6-8	H04N
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 27 May 1994	Examiner Verschelden, J
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p style="text-align: center; margin: 0;">CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone</p> <p>Y : particularly relevant if combined with another document of the same category</p> <p>A : technological background</p> <p>O : non-written disclosure</p> <p>P : intermediate document</p> </div> <div style="width: 50%;"> <p>T : theory or principle underlying the invention</p> <p>E : earlier patent document, but published on, or after the filing date</p> <p>D : document cited in the application</p> <p>L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p> </div> </div>			

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